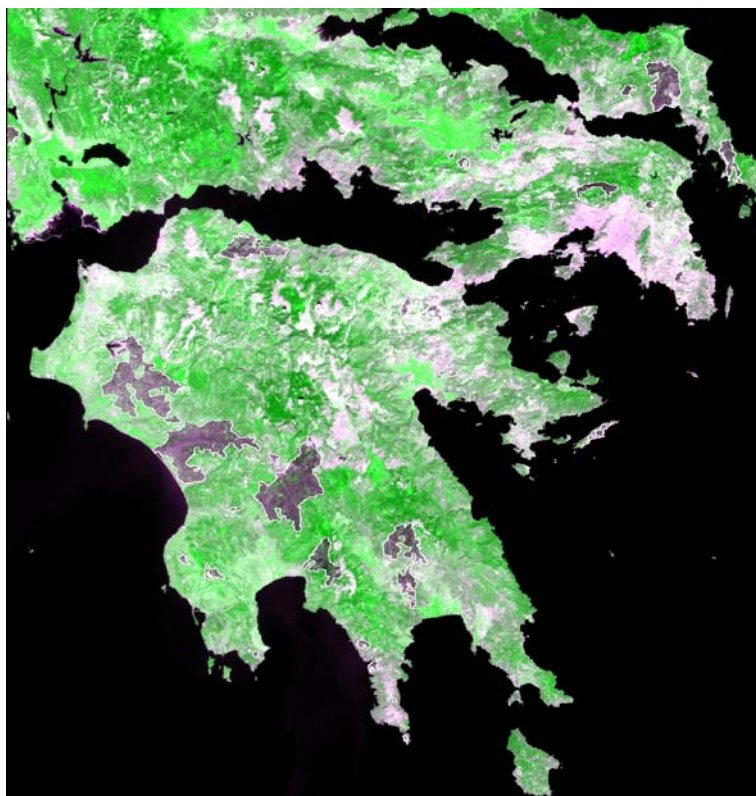




## **Analysis of forest fire damages in Natura 2000 sites during the 2007 fire season**

**San-Miguel-Ayanz J., Camia A., Liberta G., Boca, R.**



EUR 24086 EN - 2008

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**Contact information**

Address: TP261, Via Fermi, 2749 - 21027 - Ispra (VA) - Italy  
E-mail: [jesus.san-miguel@jrc.ec.europa.eu](mailto:jesus.san-miguel@jrc.ec.europa.eu)  
Tel.: 39 0332 786138  
Fax: 39 0332 786165

<http://ies.jrc.ec.europa.eu/>  
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## Introduction

This report presents the assessment of the damages caused by the forest fires in the EU Mediterranean countries (Cyprus, France, Greece, Italy, Portugal and Spain) during the fire season of 2007, with special emphasis on the impact of these fires in Natura 2000 sites.

It presents an overall short summary for the whole region and a detail analysis for each of the EU Mediterranean countries. For each country the report describes the tendency in the areas burnt by fires in the country during the last 27 years using the EU Fire database of the European Forest Fire Information System (EFFIS); in the case of Cyprus the report is limited to the last 8 years. Maps of burnt areas obtained through the processing of satellite imagery in EFFIS [1] are presented next to the list of Natura 2000 sites affected by the fires. Lastly, the report includes the list of plant and animal species of special interest in the Natura 2000 that were likely affected by the forest fires.

The mapping of forest fires satellite imagery showed a total of 810 056 ha burned in the overall Mediterranean region until the 31 August 2007. Of this figure, 465,462 ha were burnt in the EU Mediterranean countries. From this total, excluding Montenegro, Serbia and Turkey for which land cover information is not available in EFFIS, 68.2 % of the burned area was on forest land, 31.0 % was on agricultural land, and 0.8% on urban and industrial areas.

Since the Natura 2000 network exists only in EU countries, the present report focuses on the analysis of forest fire damages in the six Mediterranean countries of the EU. The analysis is presented first for Greece, the country most heavily damaged, and followed with the reports for the other countries, that is, Cyprus, France, Italy, Portugal, and Spain.

## Fire situation in the EU Mediterranean region

The number of fires in the EU Mediterranean region shows an increasing tendency in the last years, while burnt areas show a more random behaviour, with peaks in different areas of the region in the different years; the west of the Mediterranean region suffered large damages in the years 2003, 2005, 2006. The year 2007 presented extreme weather conditions in the eastern Mediterranean region and the countries in this area were heavily damaged. Figure 1 shows the areas burned in the EU Mediterranean region<sup>1</sup> in the last 27 years.

Figure 2 shows, for the EU Mediterranean countries<sup>1</sup>, the comparison of the burnt areas in the last 27 years with the estimated burned area for the year 2007<sup>2</sup> on the basis of the mapping of large fires from satellite imagery. Cyprus is not included in this graph due to the marginal contribution in terms of burnt area to the overall figure of the EU Mediterranean region.

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<sup>1</sup> Burnt areas for Cyprus are not included in this graph, as data for Cyprus are only available for the last 8 years; however, the trend of burnt areas can be considered representative for the overall EU Mediterranean region because the contribution of Cyprus in terms of burnt areas is marginal if compared to the total figure in the region.

<sup>2</sup> The estimates for 2007 are based on the mapping of burnt areas through the processing of satellite imagery, which includes only fires larger than 50 ha are mapped. The overall burnt area figure for 2007 is likely to increase slightly when official figures provided by the countries become available; these will be presented in the Forest Fires in Europe 2007 report to be published in 2008.

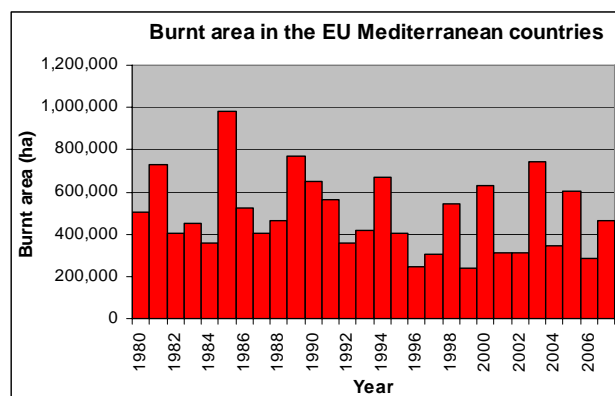


Figure 1. Burned areas in the Mediterranean region in the last decades

The monitoring of forest fire danger forecast in EFFIS [2] showed that in June and especially during the second half of July fire danger conditions have increased in southeast Europe. Bulgaria, Croatia, Greece, and Italy, amongst other countries in this region experienced extreme weather conditions that lead to a large number of forest fires. Italy and Greece were again under high fire danger conditions during the second half of August, reaching extreme fire weather conditions towards the end of the month, which resulted in catastrophic fire events. Southwest Europe experimented moderate to high fire danger conditions when compared with recent years (e.g. 2003 and 2005) although some periods of to very high fire risk, mainly in the south of the Iberian Peninsula and the Canary Islands, contributed to the development of some very large fires.

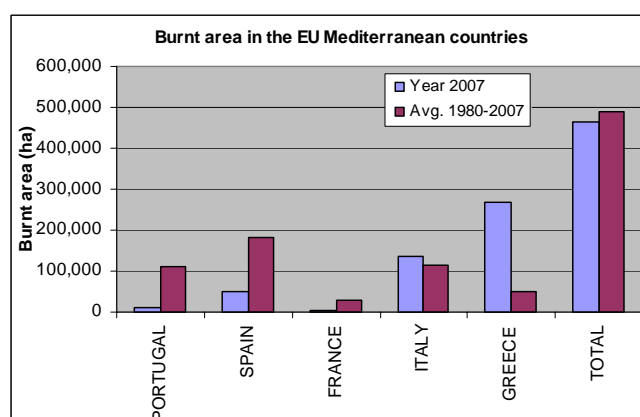


Figure 2 Comparison of fire damages in 2007 with the average damage in the last 27 years.

The overall analysis of the impact of forest fires on Natura 2000 sites presented in Table 1 and Table 2. Table 1 shows that 101,747 ha of these protected areas were burnt, which corresponds to 21.9 % of the total area burned in the countries in 2007. Table 2 shows that this figure represents 0.3% of their total Natura 2000 areas in the countries.

Table 1. Percentage of the total burnt area by country within Natura 2000 sites.

Country	Burnt area (2007) <sup>1</sup>	Burnt area in Natura 2000 (ha)	% Total burnt area in Natura 2000 sites
Cyprus	2,515	187	7.4
Spain	51,004	29,387	57.6
France	2,328	245	10.5
Greece	269,114	31,225	11.6
Italy	133,933	36,929	27.6
Portugal	9,083	3,774	41.6
EU Mediterranean region	465,462	101,747	21.9



*Table 2. Percentage of the total Natura 2000 areas affected by forest fires*

Country	Total Natura 2000 area by country (ha)	Burnt area in Natura 2000(ha)	%Natura2000 burnt in 2007
Cyprus	69,601	187	0.3
Spain	13,689,093	29,387	0.2
France	5,314,820	245	0.005
Greece	3,142,259	31,225	1.0
Italy	5,587,628	36,929	0.7
Portugal	2,010,386	3,774	0.2
EU Med. region	29,813,788	101,747	0.3

## Methodology for delineation of burnt areas

Burnt area mapping is performed using satellite remote sensing data in the European Forest Fire Information System. Since 2003 a Rapid Mapping System that provides daily updates on the burnt areas was set up in EFFIS [3]. The system includes the acquisition of two daily images of MODIS-Terra and MODIS-Aqua sensors for southern Europe during the period 1st of May to 31<sup>st</sup> of October. The spatial resolution of the MODIS imagery is 250 m. This spatial resolution is adequate to map burned areas of approximately 50 ha or larger. Time series of near infrared observation are used for identification of burnt areas. Healthy vegetation has high reflectance in near infrared spectral band. When the vegetation is burnt, the reflectance decreases significantly. This drop in the near infrared reflectance helps identifying the date of burning. The burnt areas are shown as black areas on the satellite composition used, e.g on the first page of this report.

Two spectral bands, red and near infrared, are used for burnt area detection and delineation. The example of the MODIS-Terra European-wide coverage is shown in Figure 3.



*Figure 3. MODIS data (mosaic) used for monitoring of forest fires in EFFIS.*

Mapping of burnt areas is aided through the use of another MODIS product, the so-called hot spot detection. The MODIS data of resolution 1 km contain 36 spectral bands. The band number 21 is thermal (centered at 3.9  $\mu\text{m}$ ) and is used for active fire detection (hot spots). Therefore MODIS is able

to detect those spots on the ground that are significantly hotter than their surroundings. These are identified as hot-spots, i.e. candidate fires. The spatial database of the hot spots for the whole season is kept and used for determining the date of the fire. The example of burning spot with delineated hot spot is shown in Figure 4.



*Figure 4. Image of the hot-spots in the Mediterranean region – Summer 2007.*

## Assessment of forest damages in Greece

Greece was the country most severely affected by fires in 2007. The total burnt area mapped in Greece until the 31 August 2007 was 269 114 ha.

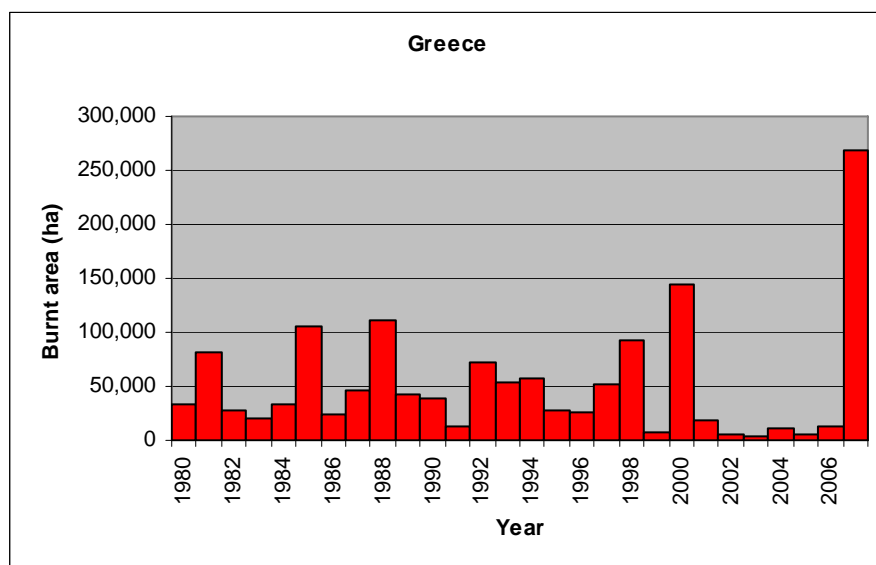


Figure 5. Burned areas in Greece in the last 27 years.

Table 3 presents the distribution of the mapped burnt area by land cover type using the CORINE Landcover 2000 database. In terms of land cover, from a total of 269 114 ha of burnt area mapped, 151 355 ha were forest land, 114 649 ha were agricultural area, and 3 110 ha were in artificial areas (urban, industrial and social areas).

Table 3 Distribution of burned area (ha) in Greece by land cover types until 31 August 2007.

Land cover	Area burned (ha)	% of total burned
Forest land	151 355	56.2
Agriculture	114 649	42.6
Artificial surfaces	3 110	1.2
<b>Total</b>	<b>269 114</b>	<b>100.0</b>

## Assessment of damages to Natura 2000 sites in Greece

The Natura 2000 consolidated spatial database [4] provided by DG ENV was used to identify sites of Natura 2000 that were affected by fire. A total of 24 Natura2000 sites in Greece were affected by forest fires. The total burnt are in Natura 2000 sites was 31225 ha, corresponding to 1.0% of the Natura 2000 are in the country, and 11.6% of the total area burned. The list of affected sites and the number of burned areas within them is provided in Table 4.

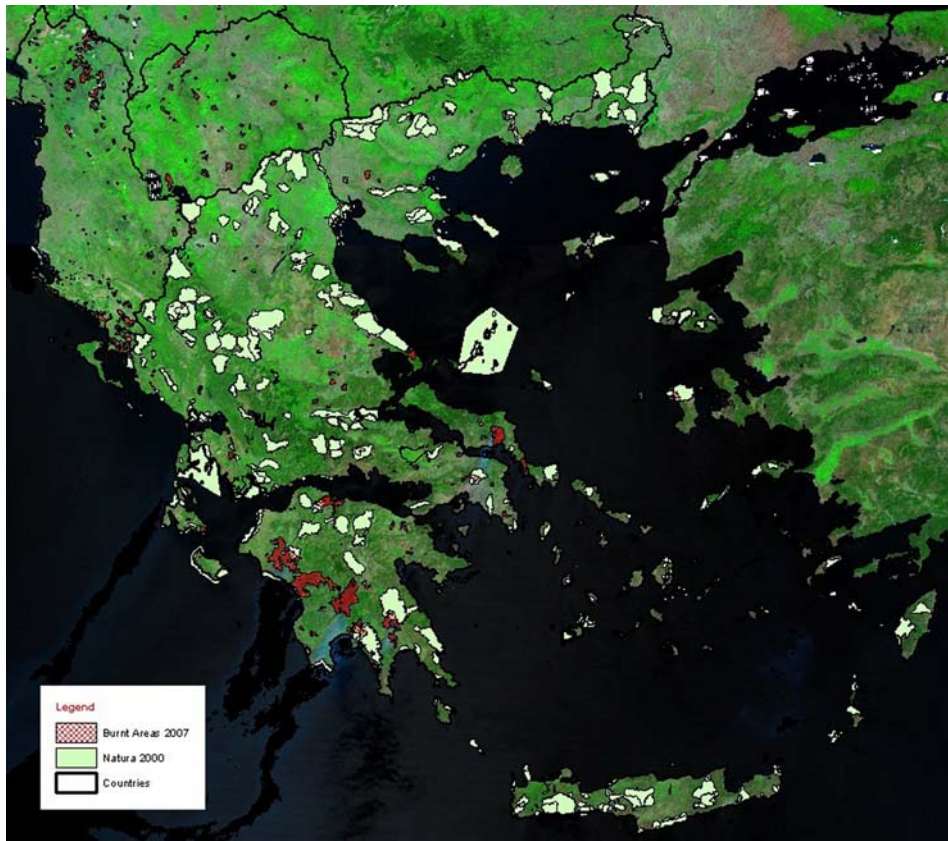
Table 4 Natura2000 sites directly affected by forest fires in Greece

SITECODE	SITENAME	Area (ha)
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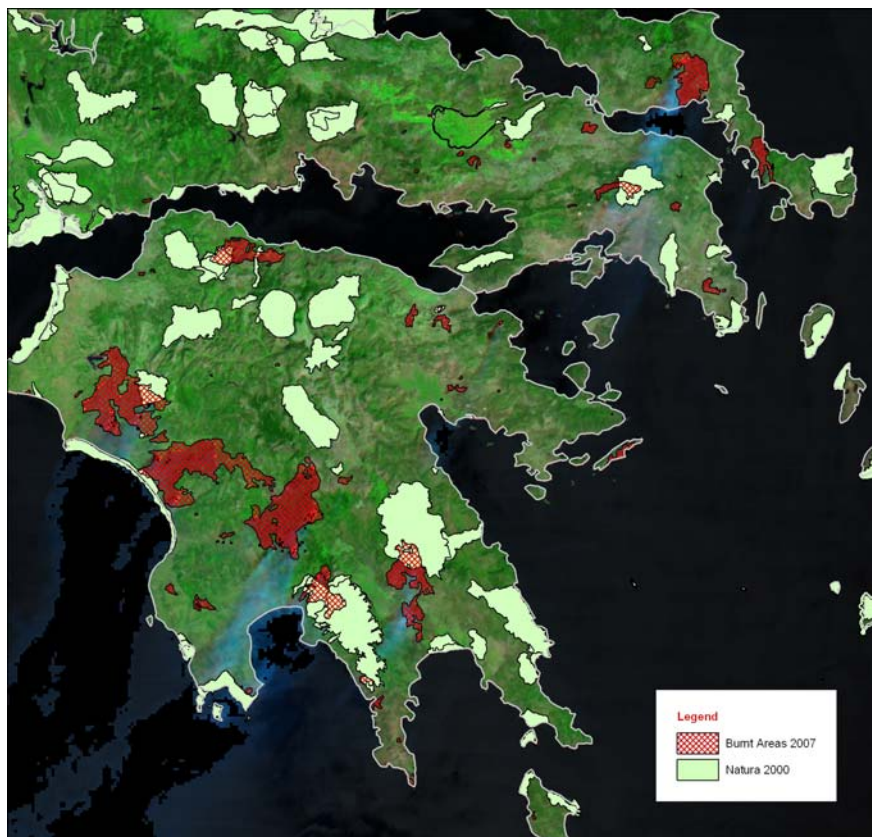


1	GR1250002	PIERIA ORI	1326.4
2	GR1340001	ETHNIKOS DRYMOS PRESPON	289.6
3	GR1430001	OROS PILIO KAI PARKATIA THALASSIA ZONI	346.7
4	GR2120009	ORI TSAMANTA, FILIATRON, FARMAKOVOUNI, MEGALI RACHI	221.7
5	GR2130008	OROS MITSIKELI	387.6
6	GR2210001	DYTIKES KAI VORIOANATOLIKES AKTES ZAKYNTHOU DELTA ACHELOOU, LIMNOTHALASSA MESOLONGIOU-AITOLIKOU KAI EKVOLES EVINOU, NISOI ECHINADES, NISOS PETALAS, DYTIKOS	51.4
7	GR2310015	ARAKYNTHOS & STENA KLEISOURAS	42.1
8	GR2320003	FARAGGI VOURAIKOU	377.3
9	GR2320005	ORI MARMPAS KAI KLOKOS, FARAGGI SELINOUNTA	1466.3
10	GR2320010	ZOUMPATA-AGIOS CHARALAMPOS-MARMPAS-KLOKOS	2370.7
11	GR2330002	OROPEDIO FOLOIS	3555.6
12	GR2330004	OLYMPIA THINES KAI PARALIAKO DASOS ZACHAROS, LIMNI KAIAFA,	87.6
13	GR2330005	STROFYLIA, KAKOVATOS	577.7
14	GR2410001	LIMNES YLIKI & PARALIMNI - SYSTIMA VOIOTIKOU KIFISSOU	4.6
15	GR2440002	KOILADA KAI EKVOLES SPERCHEIOU - MALIAKOS KOLPOS	176.4
16	GR2520006	OROS PARNONAS (KAI PERIOCHI MALEVIS)	5726.5
17	GR2530003	AKROKORINTHOS	215.8
18	GR2540005	LAGKADA TRYPI	7.0
19	GR2550006	OROS TAYGETOS	6501.8
20	GR2550009	OROS TAYGETOS - LAGKADA TRYPI	2394.0
21	GR3000001	OROS PARNITHA	2459.8
22	GR4130001	VOREIA CHIOS KAI NISOI OINOUSES KAI PARAKTIA THALASSIA ZONI	2576.1
23	GR4220011	ANATOLIKI KEA DRAPANO (VOREIOANATOLIKES AKTES) - PARALIA GEORGIOUPOLIS -	25.5
24	GR4340010	LIMNI KOURNA	36.5
	Total		31224.7

Figure 6 shows the Natura 2000 sites affected by fires in Greece, and Figure 7 provides detail mapping of those sites in the Peloponnese.



*Figure 6. Natura 2000 sites affected by forest fires in Greece.*



*Figure 7. Natura 2000 sites affected by fires in the Peloponnese and Attica regions.*

The intersection of the burnt areas and the Natura2000 database provides additional information on the plant and animal species that are potentially affected by forest fires. The list of species by categories of Mammals, Invert, Plants, and Birds are provided in *Table 5* to *Table 8*.

*Table 5 Mammal species possibly affected by forest fires.*

Lutra lutra	Rhinolophus euryale
Miniopterus schreibersi	Rhinolophus ferrum-equinum
Monachus monachus	Rhinolophus hipposideros
Myotis blythii	Spermophilus citellus
Myotis emarginatus	Tursiops truncatus
Myotis myotis	Ursus arctos
Rhinolophus blasii	

*Table 6. Invert species possibly affected by forest fires.*

Callimorpha quadripunctaria	Lycaena dispar
Eriogaster catax	Morimus funereus
Euphydryas aurinia	Unio crassus
Lucanus cervus	

*Table 7. Plant species possibly affected by forest fires.*

Carex acuta	Micromeria taygetea
Crepis crocifolia	Origanum dictamnus
Globularia stygia	Phoenix theophrasti

*Table 8. Bird species possibly affected by forest fires.*

Accipiter brevipes	Coturnix coturnix	Motacilla flava
Accipiter gentilis	Cuculus canorus	Muscicapa striata
Accipiter nisus	Cygnus cygnus	Neophron percnopterus
Acrocephalus arundinaceus	Cygnus olor	Netta rufina
Acrocephalus melanopogon	Delichon urbica	Numenius arquata
Acrocephalus palustris	Dendrocopos leucotos	Numenius tenuirostris
Acrocephalus schoenobaenus	Dendrocopos medius	Nycticorax nycticorax
Acrocephalus scirpaceus	Dendrocopos syriacus	Oenanthe hispanica
Actitis hypoleucos	Dryocopus martius	Oenanthe oenanthe
Alauda arvensis	Egretta alba	Oriolus oriolus
Alcedo atthis	Egretta garzetta	Otus scops
Anas acuta	Emberiza caesia	Oxyura leucocephala
Anas clypeata	Emberiza citrinella	Panurus biarmicus
Anas crecca	Emberiza hortulana	Passer hispaniolensis
Anas penelope	Emberiza melanocephala	Pelecanus crispus
Anas platyrhynchos	Emberiza schoeniclus	Pelecanus onocrotalus
Anas querquedula	Erithacus rubecula	Pernis apivorus
		Phalacrocorax carbo
Anas strepera	Falco biarmicus	sinensis

Anser albifrons	Falco columbarius	Phalacrocorax pygmeus
Anser anser	Falco eleonora	Philomachus pugnax
Anser erythropus	Falco naumanni	Phoenicopiterus ruber
Anthus campestris	Falco peregrinus	Phoenicurus ochruros
Anthus pratensis	Falco subbuteo	Phoenicurus phoenicurus
Anthus spinoletta	Falco tinnunculus	Phylloscopus bonelli
Anthus trivialis	Ficedula albicollis	Phylloscopus collybita
Apus apus	Ficedula hypoleuca	Phylloscopus sibilatrix
Apus melba	Ficedula semitorquata	Phylloscopus trochilus
Apus pallidus	Fringilla coelebs	Platalea leucorodia
Aquila chrysaetos	Fringilla montifringilla	Plegadis falcinellus
Aquila clanga	Fulica atra	Pluvialis apricaria
Aquila pomarina	Gallinago gallinago	Pluvialis squatarola
Ardea cinerea	Gallinago media	Podiceps cristatus
Ardea purpurea	Gavia arctica	Podiceps nigricollis
Ardeola ralloides	Gavia stellata	Porzana parva
Arenaria interpres	Gelochelidon nilotica	Prunella modularis
Asio flammeus	Glareola pratincola	Ptyonoprogne rupestris
Aythya ferina	Gyps fulvus	Pyrhonorax pyrrhonorax
Aythya fuligula	Haematopus ostralegus	Recurvirostra avosetta
Aythya nyroca	Haliaeetus albicilla	Regulus regulus
Bonasa bonasia	Hieraaetus fasciatus	Riparia riparia
Botaurus stellaris	Hieraaetus pennatus	Saxicola rubetra
Branta ruficollis	Himantopus himantopus	Scolopax rusticola
Bubo bubo	Hippoboscus pallida	Stercorarius pomarinus
Bucephala clangula	Hirundo daurica	Sterna albifrons
Burhinus oedipnemos	Hirundo rustica	Sterna caspia
Buteo buteo	Ixobrychus minutus	Sterna hirundo
Buteo rufinus	Jynx torquilla	Sterna sandvicensis
Calandrella brachydactyla	Lanius collurio	Streptopelia turtur
Calidris alpina	Lanius minor	Sturnus vulgaris
Calidris minuta	Lanius nubicus	Sylvia atricapilla
Calidris temminckii	Lanius senator	Sylvia borin
Caprimulgus europaeus	Larus canus	Sylvia cantillans
Carduelis spinus	Larus fuscus	Sylvia communis
Charadrius alexandrinus	Larus genei	Sylvia curruca
Charadrius dubius	Larus melanocephalus	Sylvia hortensis
Charadrius hiaticula	Larus minutus	Sylvia nisoria
Charadrius morinellus	Larus ridibundus	Sylvia rueppelli
Chlidonias hybridus	Limicola falcinellus	Tachybaptus ruficollis
Chlidonias leucopterus	Limosa limosa	Tadorna ferruginea
Chlidonias niger	Locustella luscinioides	Tadorna tadorna
Ciconia ciconia	Lullula arborea	Tringa erythropus
Ciconia nigra	Luscinia megarhynchos	Tringa glareola
Circaetus gallicus	Melanocorypha calandra	Tringa nebularia
Circus aeruginosus	Mergus albellus	Tringa ochropus
Circus cyaneus	Mergus merganser	Tringa totanus
Circus pygargus	Mergus serrator	Turdus iliacus
Coccothraustes		
coccothraustes	Merops apiaster	Turdus philomelos
Columba oenas	Milvus migrans	Turdus pilaris
Columba palumbus	Monticola saxatilis	Upupa epops

Coracias garrulus  
Corvus frugilegus

Motacilla alba  
Motacilla cinerea

Vanellus vanellus



## Assessment of forest fire damages in Cyprus

Cyprus was affected by fires mainly in the first part of the fire season, at the end of July. The total area burned mapped in Cyprus from satellite imagery up to the 31 August 2007 was 2 515 ha. Figure 8 shows the evolution of burnt areas in Cyprus in the last few years. The year 2007 shows figures of burnt areas slightly above those of the most recent years.

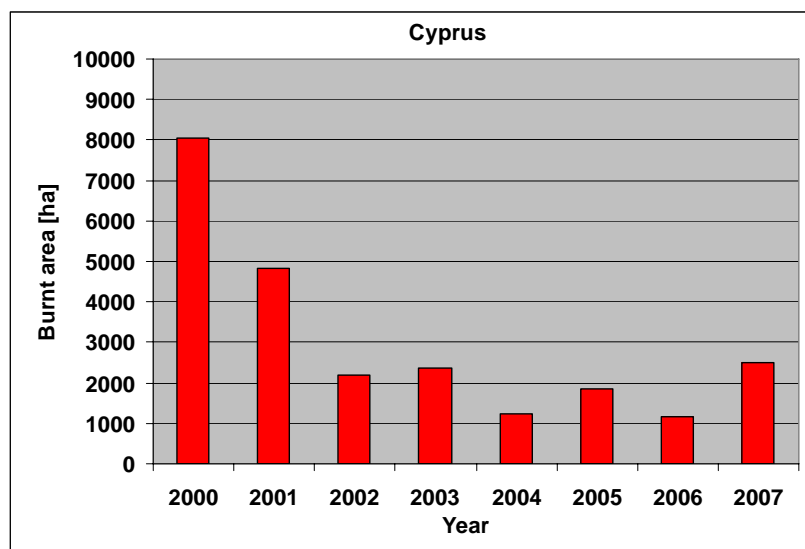


Figure 8. Burnt areas in Cyprus since the year 2000

Table 9 presents the distribution of the mapped burnt area by land use type using the CORINE Landcover 2000 database. From a total of 2 515 ha of burnt area mapped, 1 906 ha were forest land, and 609 ha were agricultural areas.

Table 9 Distribution of burnt areas (ha) in Cyprus by landcover types (until 31 August 2007).

Land cover	Area burned (ha)	% of total burned
Forest land	1 906	75.8
Agriculture	609	24.2
Artificial surfaces	0	0.0
<b>Total</b>	<b>2 515</b>	<b>100.0</b>

## Assessment of damages to Natura 2000 sites in Cyprus

From the total burnt area in Cyprus, 187 ha were on Natura 2000 sites corresponding to 0.3% of the Natura 2000 area in the country, and 7.4% of the total area burned. The sites of Natura 2000 affected by forest fires were identified through the intersection of the perimeters of the fires with the Natura 2000 database. The list of these sites is presented in Table 10.

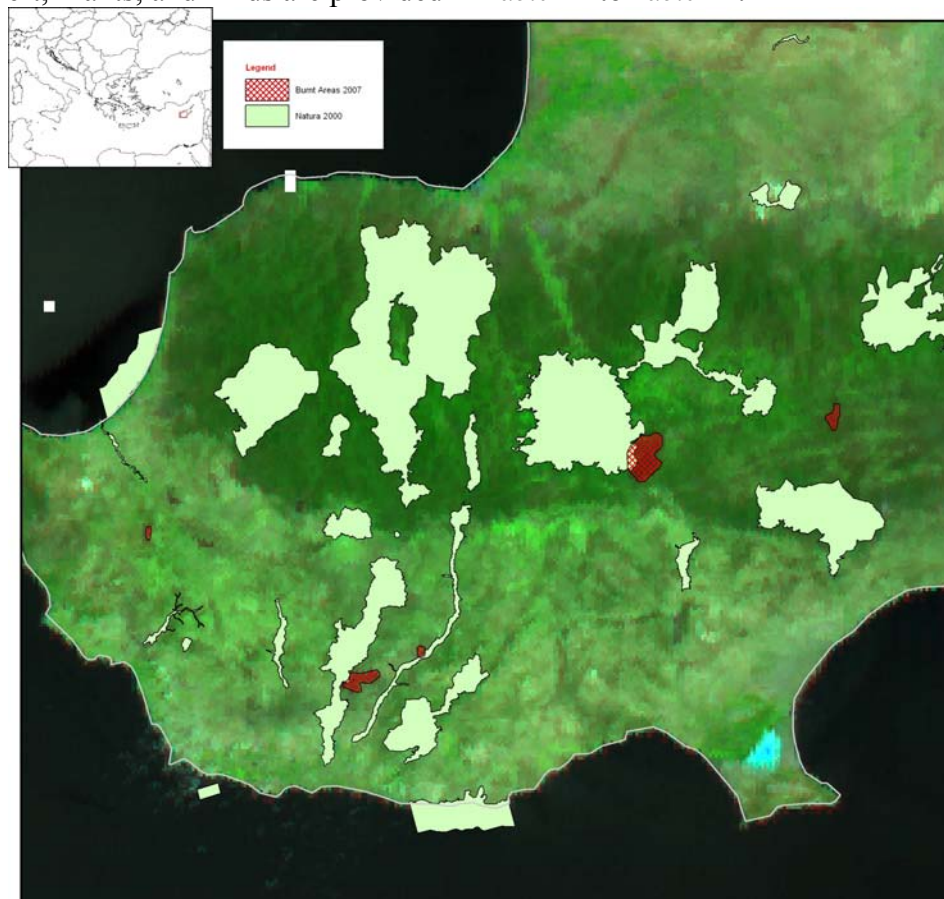
Table 10. Natura 2000 sites directly affected by forest fires in Cyprus.

	SITECODE	SITENAME	Area (ha)
1	CY5000004	ETHNIKO DASIKO PARKO TROODOUS	161.2

2	CY4000003	Unknown	9.2
3	CY4000007	XEROS POTAMOS	16.9
	Total		187.2

Figure 9 shows an image of the burnt areas and the impact on the Natura 2000 sites in Cyprus.

The intersection of the burnt areas and the Natura2000 database provides additional information on the plant and animal species that are potentially affected by forest fires. The list of species by categories of Mammals, Invert, Plants, and Birds are provided in *Table 11* to *Table 14*.



*Figure 9. Impact of forest fires in Natura 2000 sites in Cyprus*

*Table 11. Mammal species possibly affected by forest fires.*

Myotis blythi	Rousettus aegypticus
Myotis capaccinii	

*Table 12. Invert species possibly affected by forest fires.*

Callimorpha quadripunctaria

*Table 13. Plant species possibly affected by forest fires.*

Arabis kennedyae	Crocus hartmannianus
Chionodoxa lochiaie	Pinguicula crystallina
Crocus cyprius	

Table 14. Bird species possibly affected by forest fires.

Accipiter brevipes	Emberiza caesia	Parus ater cypriotes
Accipiter gentilis	Emberiza hortulana	Passer hispaniolensis
Accipiter nisus	Emberiza melanocephala	Passer montanus
Acrocephalus melanopogon	Erithacus rubecula	Pelecanus onocrotalus
Acrocephalus schoenobaenus	Falco columbarius	Pernis apivorus
Acrocephalus scirpaceus	Falco eleonora	Phalacrocorax carbo
Actitis hypoleucos	Falco peregrinus	Phalacrocorax pygmeus
Alauda arvensis	Falco subbuteo	Philomachus pugnax
Alcedo atthis	Falco vespertinus	Phoenicurus ochruros
Anas acuta	Ficedula albicollis	Phoenicurus phoenicurus
Anas clypeata	Fringilla coelebs	Phylloscopus bonelli
Anas crecca	Fringilla montifringilla	Phylloscopus collybita
Anas penelope	Fulica atra	Phylloscopus sibilatrix
Anas platyrhynchos	Gallinago gallinago	Phylloscopus trochilus
Anas querquedula	Gallinago media	Platalea leucorodia
Anthus campestris	Gallinula chloropus	Plegadis falcinellus
Anthus cervinus	Glareola pratincola	Pluvialis apricaria
Anthus spinoletta	Grus grus	Podiceps cristatus
Anthus trivialis	Gyps fulvus	Podiceps nigricollis
Apus apus	Hieraaetus fasciatus	Porzana parva
Apus melba	Hieraaetus pennatus	Porzana pusilla
Apus pallidus	Himantopus himantopus	Prunella modularis
Aquila heliaca	Hippolais pallida	Puffinus puffinus
Ardea cinerea	Hirundo daurica	Rallus aquaticus
Ardea purpurea	Hirundo rustica	Recurvirostra avosetta
Ardeola ralloides	Hoplopterus spinosus	Regulus regulus
Asio flammeus	Ixobrychus minutus	Riparia riparia
Aythya ferina	Jynx torquilla	Saxicola rubetra
Aythya fuligula	Lanius collurio	Saxicola torquata
Botaurus stellaris	Lanius minor	Sterna albifrons
Bubulcus ibis	Lanius nubicus	Sterna hirundo
Burhinus oedicnemus	Larus cachinnans	Sterna paradisaea
Calandrella brachydactyla	Larus fuscus	Streptopelia turtur
Calidris alpina	Larus genei	Sylvia atricapilla
Calidris ferruginea	Larus melanocephalus	Sylvia borin
Calidris maritima	Larus minutus	Sylvia communis
Calidris temminckii	Larus ridibundus	Sylvia curruca
Caprimulgus europaeus	Limosa limosa	Sylvia hortensis
Carduelis flammea	Lullula arborea	Sylvia melanocephala
Carduelis spinus	Luscinia megarhynchos	Sylvia melanothorax
Certhia brachydactyla dorotheae	Luscinia svecica	Sylvia nisoria
Charadrius dubius	Lymnocyptes minimus	Sylvia rueppelli
Charadrius hiaticula	Merops apiaster	Tringa erythropus
Chlidonias hybridus	Miliaria calandra	Tringa glareola
Ciconia ciconia	Milvus migrans	Tringa nebularia
Circaetus gallicus	Monticola saxatilis	Tringa ochropus
Circus aeruginosus	Monticola solitarius	Tringa stagnatilis
Circus cyaneus	Motacilla alba	Tringa totanus
Circus macrourus	Motacilla cinerea	Turdus iliacus
Circus pygargus	Motacilla flava	Turdus merula
Clamator glandarius	Muscicapa striata	Turdus philomelos
Coccothraustes coccothraustes	Netta rufina	Turdus pilaris
Columba oenas	Numenius arquata	Turdus torquatus

Coracias garrulus  
Coturnix coturnix  
Crex crex  
Cuculus canorus  
Delichon urbica  
Egretta alba  
Egretta garzetta

Nycticorax nycticorax  
Oenanthe cypriaca  
Oenanthe hispanica  
Oenanthe isabellina  
Oenanthe oenanthe  
Oriolus oriolus  
Pandion haliaetus

Turdus viscivorus  
Upupa epops  
Vanellus vanellus

## Assessment of forest fire damages in Italy

The impact of forest fires in Italy in the last few years was not very high, except for 2003 that was a critical year for the Mediterranean region. However, the number of fires and the total burnt area increased in 2007. The evolution of the burnt areas in Italy during the last 27 years is presented in Figure 10.

During the summer of 2007, Italy suffered very high fire risk conditions at the end of July and end of August, which led to a large number of areas affected by forest fires in the South of the country. Figure Italy was the 2<sup>nd</sup> country most severely affected by forest fires in 2007. The total burned area mapped in Italy until 31 August 2007 was 133 933 ha.

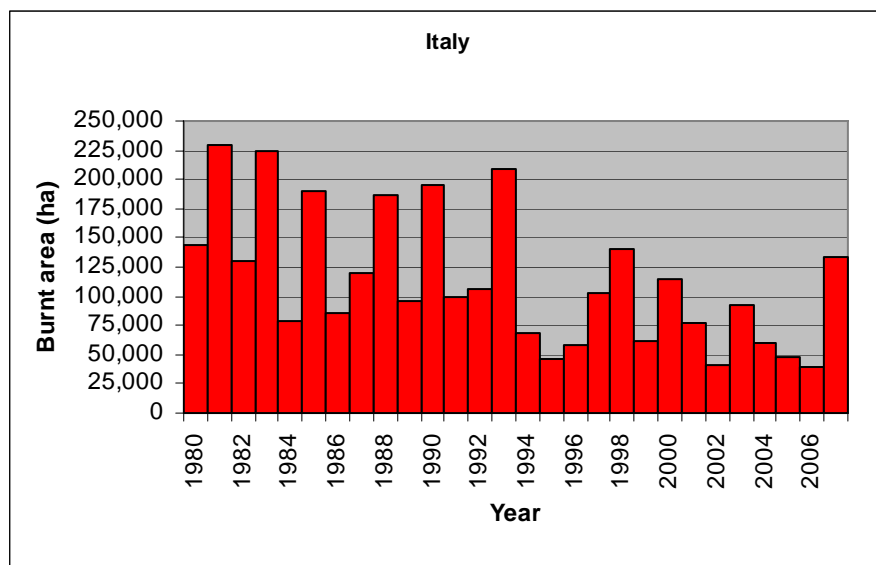


Figure 10. Burnt areas in Italy in the last decades.

Table 15 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 map. In terms of land cover, from a total of 133 933 ha of burnt area mapped, 84 105 ha of land have been burnt in forest, 48 363 ha were agricultural land, and 1 465 ha in artificial areas (urban, industrial and social areas).

Table 15. Distribution of burned area (ha) in Italy by landcover types (until 31 August 2007).

Land cover	Area burned (ha)	% of total burned
Forest land	84 105	62.8
Agriculture	48 363	36.1
Artificial surfaces	1 465	1.1
<b>Total</b>	<b>133 933</b>	<b>100.0</b>



## Assessment of damages to Natura 2000 sites in Italy

From the total burnt area estimated for Italy (133933 ha), 36,929 ha corresponded to areas within Natura 2000 sites. This figure represents 0.7% of the total Natura 2000 areas in the country and 27.6% of the total burnt area. This is the largest damage to Natura 2000 sites in any single country in the year 2007. A total of 127 sites of Natura 2000 were damaged by forest fires. The complete list of these sites is presented in *Table 16*.

*Table 16. Natura2000 sites directly affected by forest fires in Italy*

	SITECODE	SITENAME	Area (ha)
1	IT5310019	Monte Catria, Monte Acuto	22.79563
2	IT5310031	Monte Catria, Monte Acuto e Monte della Strega	22.79563
3	IT5320004	Gola della Rossa	11.34917
4	IT5320011	Monte Puro - Rogedano - Valleremita	0.023081
5	IT5320017	Gola della Rossa e di Frasassi	35.43925
6	IT6020019	Monte Degli Elci e Monte Grottone	0.090675
7	IT6030005	Comprensorio meridionale dei Monti della Tolfa	131.6003
8	IT6030043	Monti Lepini centrali	51.96593
9	IT6040027	Monte Redentore (versante sud)	81.68466
10	IT6040043	Parco Naturale "Monti Aurunci"	1632.431
11	IT6050026	Parete del Monte Fammera	38.64464
12	IT7110128	Parco Nazionale Gran Sasso - Monti della Laga	1074.101
13	IT7110130	Sirente Velino	1619.061
14	IT7130024	Monte Picca - Monte di Roccatagliata	360.1632
15	IT7130031	Fonte di Papa	227.4982
16	IT7140126	Gessi di Lentella	89.20358
17	IT7140127	Fiume Trigno (medio e basso corso)	84.25233
18	IT7140129	Parco Nazionale della Maiella	1624.31
19	IT7140203	Maiella	167.6382
20	IT7212171	Monte Corno - Monte Sammucro	34.08913
21	IT7222127	Fiume Trigno (confluenza Verrino - Castellelce)	13.66696
22	IT7222250	Bosco Casale - Cerro del Ruccolo	0.07125
23	IT7228226	Macchia Nera - Colle Serracina	70.83241
24	IT8010006	Catena di Monte Maggiore	167.3135
25	IT8010013	Matese Casertano	69.25878
26	IT8010016	Monte Tifata	417.7392
27	IT8010017	Monti di Mignano Montelungo	42.25852
28	IT8010022	Vulcano di Roccamonfina	177.1534
29	IT8020008	Massiccio del Taburno	284.2592
30	IT8030006	Costiera amalfitana tra Nerano e Positano	71.51798
31	IT8030008	Dorsale dei Monti Lattari	131.5854
32	IT8040006	Dorsale dei Monti del Partenio	219.4936
33	IT8040013	Monti di Lauro	48.06431
34	IT8040021	Picentini	33.54754
35	IT8050002	Alta Valle del Fiume Calore Lucano (Salernitano)	4.306761
36	IT8050013	Fiume Mingardo	70.97851
37	IT8050022	Montagne di Casalbuono	45.05404
38	IT8050023	Monte Bulgheria	180.5147
39	IT8050026	Monte Licosa e dintorni	73.75312
40	IT8050027	Monte Mai e Monte Monna	33.54754
41	IT8050028	Monte Motola	340.4028
42	IT8050030	Monte Sacro e dintorni	65.16228
43	IT8050034	Monti della Maddalena	211.2003

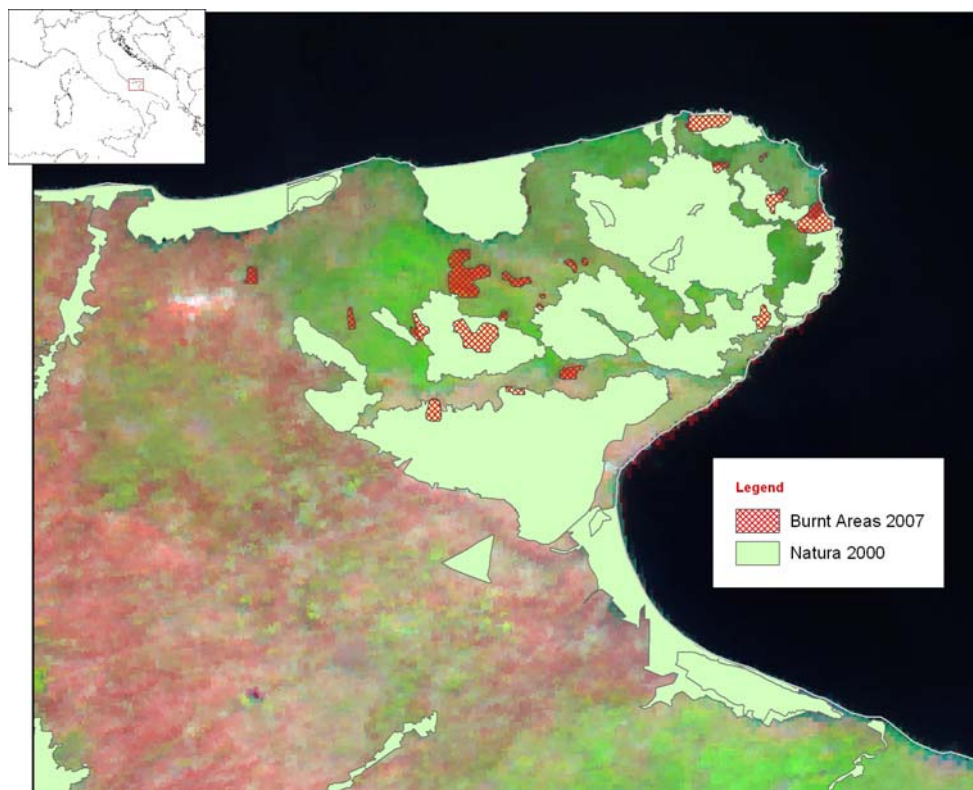
44	IT8050046	Monte Cervati e dintorni	320.1832
45	IT8050048	Costa tra Punta Tresino e le Ripe Rosse	107.6631
46	IT8050054	Costiera Amalfitana tra Maiori e il Torrente Bonea	0.487084
47	IT9110004	Foresta Umbra	64.51476
48	IT9110008	Valloni e Steppe Pedegarganiche	398.5634
49	IT9110009	Valloni di Mattinata - Monte Sacro	256.6833
50	IT9110012	Testa del Gargano	758.5148
51	IT9110024	Castagneto Pia, Lapolda, Monte la Serra	17.6609
52	IT9110025	Manacore del Gargano	550.9351
53	IT9110026	Monte Calvo - Piana di Montenero	1188.18
54	IT9110030	Bosco Quarto - Monte Spigno	18.80137
55	IT9110035	Monte Sambuco	73.42335
56	IT9120007	Murgia Alta	361.3838
57	IT9120008	Bosco Difesa Grande	198.7485
58	IT9130005	Murgia di Sud - Est	589.4401
59	IT9130007	Area delle Gravine	482.6457
60	IT9210070	Bosco Vaccarizzo	1.853425
61	IT9210155	Marina di Castrocucco	57.83129
62	IT9310008	La Petrosa	23.78913
63	IT9310025	Valle del Fiume Lao	10.58882
64	IT9310301	Unknown	14.12862
65	IT9310303	Unknown	2762.309
66	IT9320302	Unknown	580.0987
67	IT9330117	Pinete del Roncino	54.45068
68	IT9330184	Scogliera di Staletti	0.066484
69	IT9350135	Vallata del Novito e Monte Mutolo	71.48164
70	IT9350139	Collina di Pentimele	69.31043
71	IT9350149	Sant'Andrea	28.01634
72	IT9350164	Torrente Vasi	42.22803
73	IT9350167	Valle Moio (Delianova)	3.521384
74	IT9350181	Monte Embrisi e Monte Torrione	10.66352
75	IT9350300	Unknown	999.792
76	ITA010013	Bosco di Calatafimi	4.573494
77	ITA010015	Complesso Monti di Castellammare del Golfo (TP)	25.16492
78	ITA010017	Capo S.Vito, Monte Monaco, Zingaro, Faraglioni Scopello, Monte Sparacio	539.5357
79	ITA010029	Unknown	565.7165
80	ITA020002	Boschi di Gibilmanna e Cefal-	220.5502
81	ITA020007	Boschi Ficuzza e Cappelliere, V.ne Cerasa, Castagneti Mezzojuso Monte Quacella, Monte dei Cervi, Pizzo Carbonara, Monte Ferro, Pizzo	17.46278
82	ITA020016	Otiero	11.01748
83	ITA020017	Complesso Pizzo Dipilo e Querceti su calcare	1029.291
84	ITA020021	Montagna Longa, Pizzo Montanello	180.1276
85	ITA020023	Raffo Rosso, Monte Cuccio e Vallone Sagana	1840.304
86	ITA020027	Monte Lato, Kumeta, Maganoce e Pizzo Parrino	419.8898
87	ITA020030	Monte Matassaro, Monte Gradara ed Monte Signora	715.2304
88	ITA020032	Boschi di Granza	92.92918
89	ITA020033	Monte San Calogero (Termini Imerese)	859.9123
90	ITA020035	Monte Genuardo e Santa Maria del Bosco	109.8019
91	ITA020037	Monti Barracu', Cardelia, Pizzo Cangialosi e Gole del Torrente Corleone	53.85895
92	ITA020039	Monte Cane, Pizzo Selva a Mare, Monte Trigna	25.59146
93	ITA020048	Unknown	208.0454
94	ITA020049	Unknown	1061.638
95	ITA020050	Unknown	3628.452
96	ITA030001	Stretta di Longi	157.5141
97	ITA030003	Rupi di Taormina e Monte Veneretta	140.4527
98	ITA030004	Bacino del Torrente Letojanni	43.41083
99	ITA030005	Bosco di Malabotta	4.787784

100	ITA030006	Rocca di Novara	72.54608
101	ITA030009	Pizzo Mualio, Montagna di Verna'	6.515325
102	ITA030011	Dorsale Curcuraci, Antennamare	524.5774
103	ITA030013	Rocche di Alcara Li Fusi	436.1907
104	ITA030017	Vallone Laccaretta e Urio Quattrocchi	41.54124
105	ITA030019	Tratto Montano del Bacino della Fiumara di Agro'	47.66749
106	ITA030036	Riserva naturale del Fiume Alcantara	10.47653
107	ITA030038	Serra del Re, Monte Soro e Biviere di Cesaro'	23.60462
108	ITA030042	Unknown	990.3475
109	ITA030043	Unknown	909.8575
110	ITA040006	Complesso Monte Telegrafo e Rocca Ficuzza	27.26803
111	ITA040007	Pizzo della Rondine, Bosco di S. Stefano Quisquina	418.2937
112	ITA040008	Maccalube di Aragona	82.85771
113	ITA050004	Monte Capodarso e Valle del Fiume Imera Meridionale	206.204
114	ITA050009	Rupe di Marianopoli	2.041369
115	ITA050010	Pizzo Muculufa	73.30073
116	ITA060003	Lago di Pozzillo	48.17826
117	ITA070005	Bosco di Santo Pietro	80.18046
118	ITA070016	Valle del Bove	32.45913
119	ITA070027	Contrada Sorbera e Contrada Gibiotti	120.5834
120	ITA090007	Cava Grande del Cassibile, Cava Cinque Porte, Cava e Bosco di Bauli	68.81019
121	ITA090024	Cozzo Ogliastri	64.98185
122	ITB020040	Valle del Temo	206.9615
123	ITB021101	Altopiano di Campeda	111.1498
124	ITB021156	Monte Gonare	0.033688
125	ITB030032	Stagno di Corru S'Ittiri	166.508
126	ITB040028	Punta S'Aliga	0.871211
127	ITB041105	Foresta di Monte Arcosu	0.473113
	Total		36928.52

Figures 11 to 14 show details of the impact of forest fires in Natura 2000 sites in central and southern Italy.



*Figure 11. Impact of forest fires in Natura 2000 – Sicily and Calabria*



*Figure 12. Impact of forest fires in Natura 2000 – Italy, Gargano*



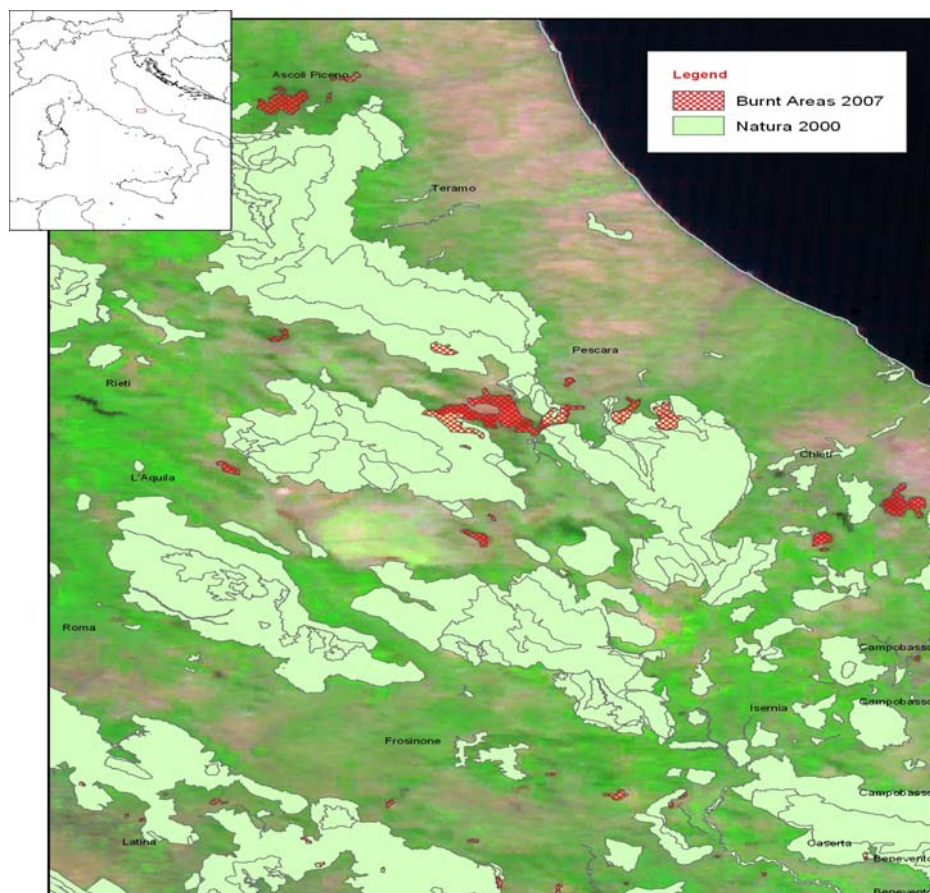


Figure 13. Impact of forest fires in Natura 2000 – Central Italy

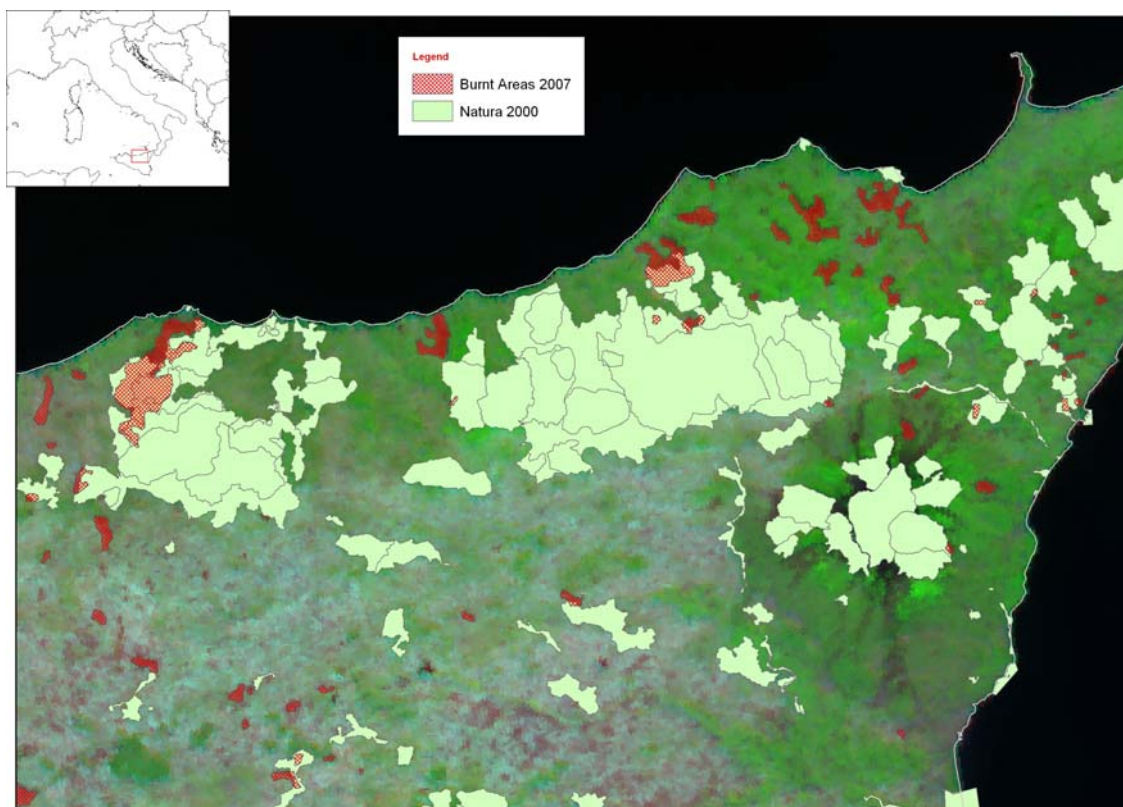


Figure 14. Impact of forest fires in Natura 2000 – Italy-Sicily



The intersection of the burnt areas and the Natura2000 database provided additional information on the plant and animal species that were potentially affected by forest fires. The list of species by categories of Mammals, Invert, Plants, and Birds are provided in Table 17 to Table 20.

*Table 17. Mammal species possibly affected by forest fires.*

Barbastella barbastellus	Myotis emarginatus
Canis lupus	Myotis myotis
Cervus elaphus corsicanus	Rhinolophus euryale
Lutra lutra	Rhinolophus ferrumequinum
Miniopterus schreibersi	Rhinolophus hipposideros
Myotis bechsteini	Rhinolophus mehelyi
Myotis blythii	Rupicapra ornata
Myotis capaccinii	Ursus arctos

*Table 18. Invert species possibly affected by forest fires.*

Austropotamobius pallipes	Lucanus cervus
Callimorpha quadripunctaria	Melanargia arge
Cerambyx cerdo	Osmoderma eremita
Coenagrion mercuriale	Oxygastra curtisii
Cordulegaster trinacriae	Papilio hospiton
Eriogaster catax	Rosalia alpina
Euphydryas aurinia	Vertigo angustior
Lindenia tetraphylla	

*Table 19. Plant species possibly affected by forest fires.*

Adonis distorta	Leontodon sicularis
Androsace mathildae	Linaria flava
Aster sorrentinii	Ophrys lunulata
Astragalus verrucosus	Primula palinuri
Brassica insularis	Rouya polygama
Buxbaumia viridis	Stipa austroitalica
Cypripedium calceolus	Woodwardia radicans
Dianthus rupicola	

*Table 20. Bird species possibly affected by forest fires.*

Accipiter gentilis	Cygnus cygnus	Netta rufina
Accipiter gentilis arrigonii	Delichon urbica	Numenius arquata
Accipiter nisus	Dendrocopos leucotos	Nycticorax nycticorax
Acrocephalus arundinaceus	Dendrocopos major	Oenanthe hispanica
Acrocephalus melanopogon	Dendrocopos medius	Oriolus oriolus
Acrocephalus scirpaceus	Dendrocopos minor	Pandion haliaetus
Actitis hypoleucos	Dryocopus martius	Parus ater
Aegithalos caudatus	Egretta alba	Parus palustris
Alauda arvensis	Egretta garzetta	Perdix perdix
Alcedo atthis	Emberiza cia	Pernis apivorus
Alectoris barbara	Emberiza hortulana	Petronia petronia
Alectoris graeca	Emberiza melanocephala	Phalacrocorax carbo

<i>Alectoris graeca saxatilis</i>	<i>Falco biarmicus</i>	<i>Phalacrocorax carbo sinensis</i>
<i>Alectoris graeca whitakeri</i>	<i>Falco columbarius</i>	<i>Phasianus colchicus</i>
<i>Anas acuta</i>	<i>Falco eleonora</i>	<i>Philomachus pugnax</i>
<i>Anas clypeata</i>	<i>Falco naumanni</i>	<i>Phoenicopterus ruber</i>
<i>Anas crecca</i>	<i>Falco peregrinus</i>	<i>Phoenicurus phoenicurus</i>
<i>Anas penelope</i>	<i>Falco subbuteo</i>	<i>Phylloscopus bonelli</i>
<i>Anas platyrhynchos</i>	<i>Falco tinnunculus</i>	<i>Phylloscopus collybita</i>
<i>Anas querquedula</i>	<i>Falco vespertinus</i>	<i>Phylloscopus sibilatrix</i>
<i>Anas strepera</i>	<i>Ficedula albicollis</i>	<i>Picus viridis</i>
<i>Anser anser</i>	<i>Ficedula hypoleuca</i>	<i>Platalea leucorodia</i>
<i>Anthus campestris</i>	<i>Fratercula arctica</i>	<i>Plegadis falcinellus</i>
<i>Anthus pratensis</i>	<i>Fringilla coelebs</i>	<i>Pluvialis apricaria</i>
<i>Apus apus</i>	<i>Fringilla montifringilla</i>	<i>Pluvialis squatarola</i>
<i>Apus melba</i>	<i>Fulica atra</i>	<i>Porphyrio porphyrio</i>
<i>Apus pallidus</i>	<i>Galerida cristata</i>	<i>Porzana parva</i>
<i>Aquila chrysaetos</i>	<i>Gallinago gallinago</i>	<i>Porzana porzana</i>
<i>Aquila clanga</i>	<i>Gallinula chloropus</i>	<i>Pyrhacorax pyrrhacorax</i>
<i>Aquila heliaca</i>	<i>Garrulus glandarius</i>	<i>Pyrrhula pyrrhula</i>
<i>Aquila pomarina</i>	<i>Gelochelidon nilotica</i>	<i>Rallus aquaticus</i>
<i>Ardea purpurea</i>	<i>Glareola pratincola</i>	<i>Recurvirostra avosetta</i>
<i>Asio flammeus</i>	<i>Grus grus</i>	<i>Regulus regulus</i>
<i>Asio otus</i>	<i>Gyps fulvus</i>	<i>Scolopax rusticola</i>
<i>Athene noctua</i>	<i>Hieraaetus fasciatus</i>	<i>Sitta europaea</i>
<i>Aythya ferina</i>	<i>Hieraaetus pennatus</i>	<i>Sterna albifrons</i>
<i>Aythya fuligula</i>	<i>Himantopus himantopus</i>	<i>Sterna hirundo</i>
<i>Aythya nyroca</i>	<i>Hippolais polyglotta</i>	<i>Sterna sandvicensis</i>
<i>Botaurus stellaris</i>	<i>Hirundo daurica</i>	<i>Streptopelia decaocto</i>
<i>Bubo bubo</i>	<i>Hirundo rustica</i>	<i>Streptopelia turtur</i>
<i>Burhinus oedienemus</i>	<i>Ixobrychus minutus</i>	<i>Strix aluco</i>
<i>Buteo buteo</i>	<i>Jynx torquilla</i>	<i>Sylvia atricapilla</i>
<i>Buteo rufinus</i>	<i>Lanius collurio</i>	<i>Sylvia communis</i>
<i>Calandrella brachydactyla</i>	<i>Lanius minor</i>	<i>Sylvia conspicillata</i>
<i>Calonectris diomedea</i>	<i>Lanius senator</i>	<i>Sylvia hortensis</i>
<i>Caprimulgus europaeus</i>	<i>Larus argentatus</i>	<i>Sylvia sarda</i>
<i>Carduelis spinus</i>	<i>Larus canus</i>	<i>Sylvia undata</i>
<i>Charadrius dubius</i>	<i>Larus fuscus</i>	<i>Tadorna ferruginea</i>
<i>Charadrius hiaticula</i>	<i>Larus genei</i>	<i>Tetrax tetrax</i>
<i>Charadrius morinellus</i>	<i>Larus melanocephalus</i>	<i>Tichodroma muraria</i>
<i>Ciconia ciconia</i>	<i>Larus ridibundus</i>	<i>Tringa erythropus</i>
<i>Ciconia nigra</i>	<i>Limosa lapponica</i>	<i>Tringa glareola</i>
<i>Circaetus gallicus</i>	<i>Lullula arborea</i>	<i>Tringa nebularia</i>
<i>Circus aeruginosus</i>	<i>Luscinia megarhynchos</i>	<i>Tringa ochropus</i>
<i>Circus cyaneus</i>	<i>Lymnocyptes minimus</i>	<i>Tringa totanus</i>
<i>Circus cyaneus</i>	<i>Melanocorypha calandra</i>	<i>Turdus iliacus</i>
<i>Circus macrourus</i>	<i>Mergus serrator</i>	<i>Turdus merula</i>
<i>Circus pygargus</i>	<i>Merops apiaster</i>	<i>Turdus philomelos</i>
<i>Coccothraustes</i>		
<i>coccothraustes</i>	<i>Milvus migrans</i>	<i>Turdus pilaris</i>
<i>Columba livia</i>	<i>Milvus milvus</i>	<i>Turdus torquatus</i>
<i>Columba oenas</i>	<i>Monticola saxatilis</i>	<i>Turdus viscivorus</i>
<i>Columba palumbus</i>	<i>Monticola solitarius</i>	<i>Tyto alba</i>

Coracias garrulus  
Corvus corax  
Coturnix coturnix  
Cuculus canorus

Montifringilla nivalis  
Motacilla alba  
Muscicapa striata  
Neophron percnopterus

Upupa epops  
Vanellus vanellus

## Assessment of forest fire damages in France

France was affected by forest fires mainly during the month of July. The total burned area mapped in France until 31 August 2007 was 2 328 ha. Figure 15 shows the evolution of the areas burnt by forest fires in France during the last decades. It can be observed in this figure that areas burnt in 2007 are below the average values for the last years.

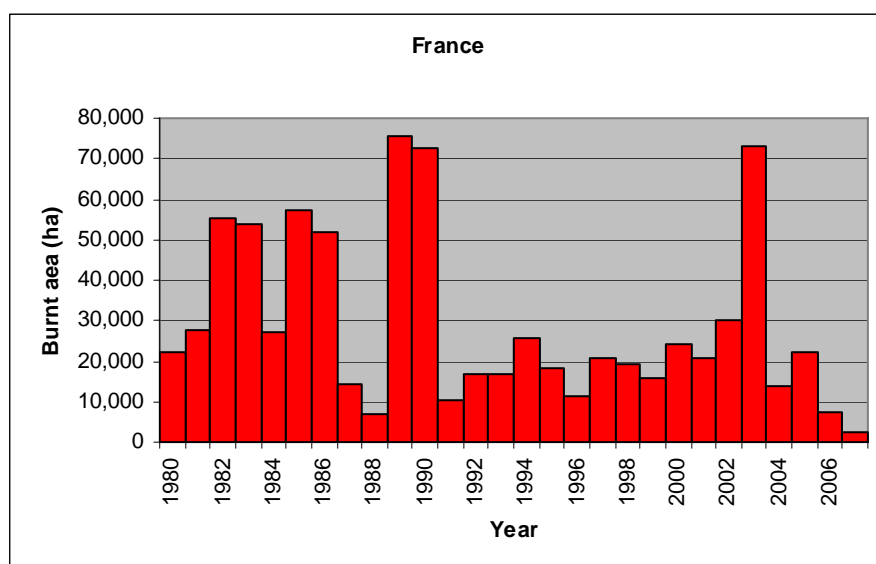


Figure 15. Trends of burnt areas in France in the last decades

Table 21 presents the distribution of the mapped burnt area by land cover type using the CORINE Landcover database. In terms of land cover, from a total of 2 328 ha of burnt area mapped, 2 241 ha of land have been burnt in forest, 56 ha were agricultural land, and 31 ha in artificial areas (urban, industrial and social areas).

Table 21. Distribution of burnt area (ha) in France by landcover types (until 31 August 2007).

Land cover	Area burned (ha)	% of total burned
Forest land	2 241	96.3
Agriculture	56	2.4
Artificial surfaces	31	1.3
<b>Total</b>	<b>2 328</b>	<b>100.0</b>

## Assessment of damages to Natura 2000 sites in France

From the total burnt area in the country, 10.5% corresponded to Natura 2000 sites. A total of 245 ha were burnt on 4 protected sites, which are listed in Table 22. The percentage of burnt areas in Natura 2000 is negligible when compared to the total area of Natura 2000 sites in France that covers over 5 million ha. Figure 16 shows the detail of the impact of fires in the Natura 2000 sites in southern France.

Table 22. Natura 2000 sites directly affected by forest fires in France.

SITECODE	SITENAME	Area (ha)
----------	----------	-----------

		MASSIF DU LAUVET D'ILONSE ET DES QUATRE CANTONS -	
1	FR9301556	DOME DE BARROT - GORGES DU CIAN	119.2
2	FR9301568	CORNICHES DE LA RIVIERA	34.6
3	FR9301625	FORET DE PALAYSON - BOIS DU ROUET	49.7
4	FR9400579	MONTE D'ORO / VIZZAVONA	41.5
	Total		244.9

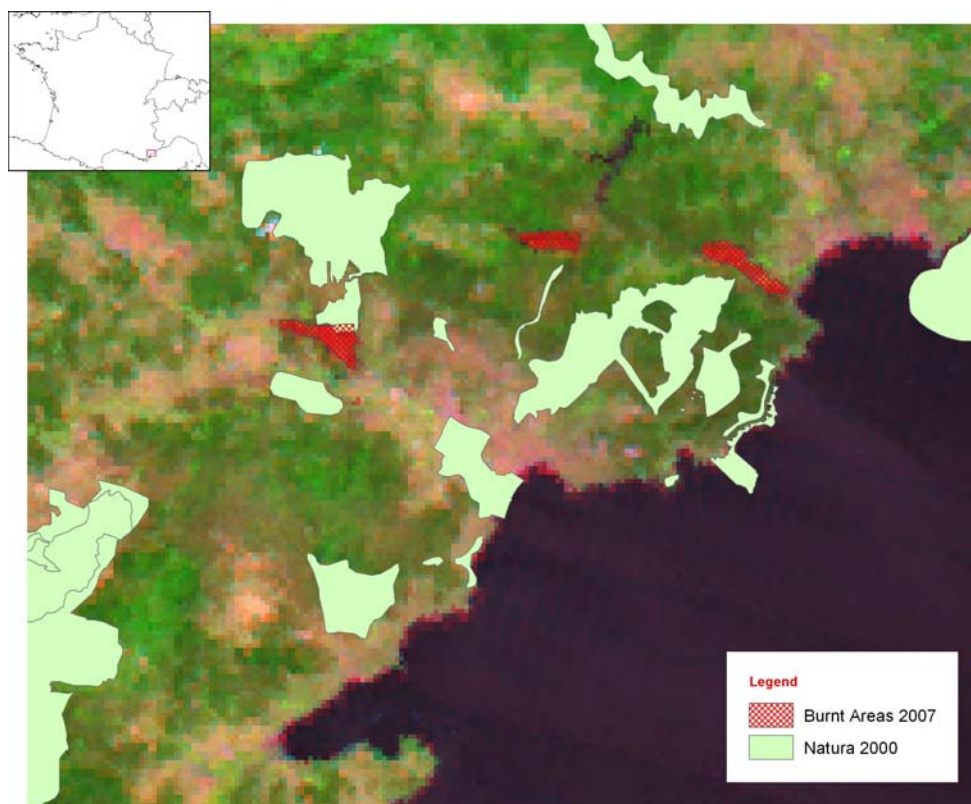


Figure 16. Detail of the Natura 2000 sites affected by fires in southern France.

The intersection of the burnt areas and the Natura2000 provides additional information on the plant and animal species of special interest that were potentially affected by forest fires. The lists of species by categories are provided in Table 23 to Table 25.

Table 23. Mammal species possibly affected by forest fires.

Barbastella barbastellus	Myotis myotis
Myotis bechsteini	Rhinolophus ferrum-equinum
Myotis emarginatus	Rhinolophus hipposideros

Table 24. Invert species possibly affected by forest fires.

Callimorpha quadripunctaria	Lucanus cervus
Cerambyx cerdo	Oxygastra curtisii
Eriogaster catax	Papilio hospiton
Euphydryas aurinia	

Table 25. Plant species possibly affected by forest fires.

Aquilegia bertolonii	Gentiana ligustica
Buxbaumia viridis	Leucojum nicaense



# Assessment of forest fire damages in Portugal

The trend in the total number of ha burned in Portugal in the last decades (see Figure 17) shows that 2007 was a quiet year in terms of forest fires in Portugal. The total burned area mapped in Portugal until 31 August 2007 was 9 083 ha.

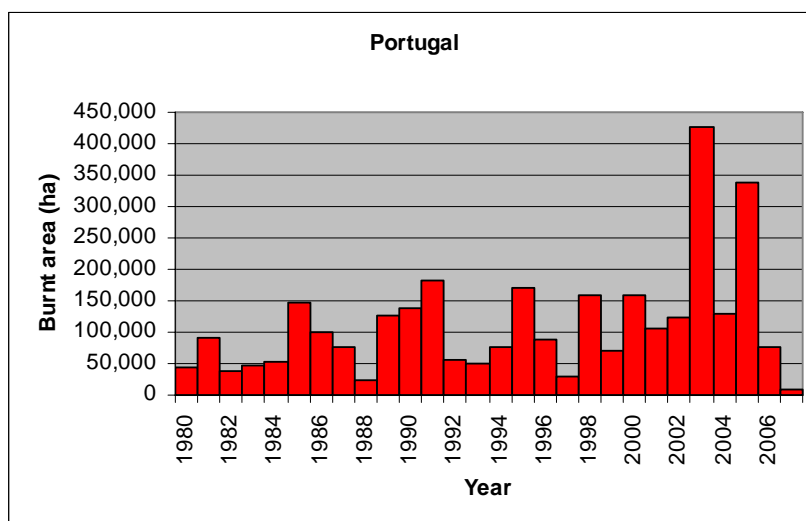


Figure 17. Trend of burnt areas in Portugal in the last 27 years.

**Table 26** presents the distribution of the mapped burnt area by land cover type using the CORINE Landcover 2000 database. In terms of land cover, from a total of 9 083 ha of burnt area mapped, 6 385 ha of land have been burnt in forest, 2 679 ha were agricultural land, and 19 ha in artificial areas (urban, industrial and social areas).

**Table 26.** Distribution of burned area (ha) in Portugal by land cover types (until 31 August 2007).

Land cover	Area burned (ha)	% of total burned
Forest land	6 385	70.3
Agriculture	2 679	29.5
Artificial surfaces	19	0.2
<b>Total</b>	<b>9 083</b>	<b>100.0</b>

## Assessment of damages on Natura 2000 sites in Portugal

The analysis of impact of forest fires in Portugal showed that 3,775 ha were burnt in Natura 2000 sites, corresponding to 0.2% of the Natura 2000 areas in Portugal, and 41.6% of the total area burned. Fires affected 8 Natura 2000 sites in the country. The list of these sites is presented in *Table 27*. Some details on Natura 2000 sites affected by forest fires in central and southern Portugal area presented in Figures 18 and 19.

*Table 27. Natura 2000 sites directly affected by forest fires in Portugal.*

0	SITECODE	SITENAME	Area (ha)
1	PTCON0001	Peneda/Geros	220.0

2	PTCON0002	Montesinho/Nogueira	42.2
3	PTCON0036	Guadiana	953.8
4	PTCON0044	Nisa / Lage da Prata	155.1
5	PTCON0045	Sic Alvaizere	773.8
6	PTCON0059	Rio Paiva	240.9
7	PTZPE0039	Vale do C	563.9
8	PTZPE0047	Vale do Guadiana	825.2
	Total		3774.9

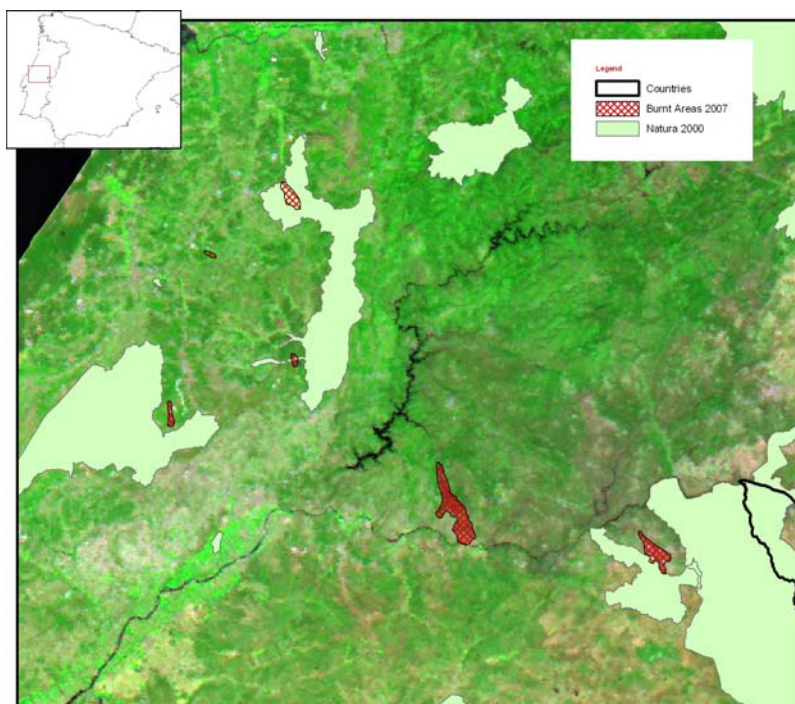


Figure 18. Impact of forest fires in Natura 2000 sites – central Portugal

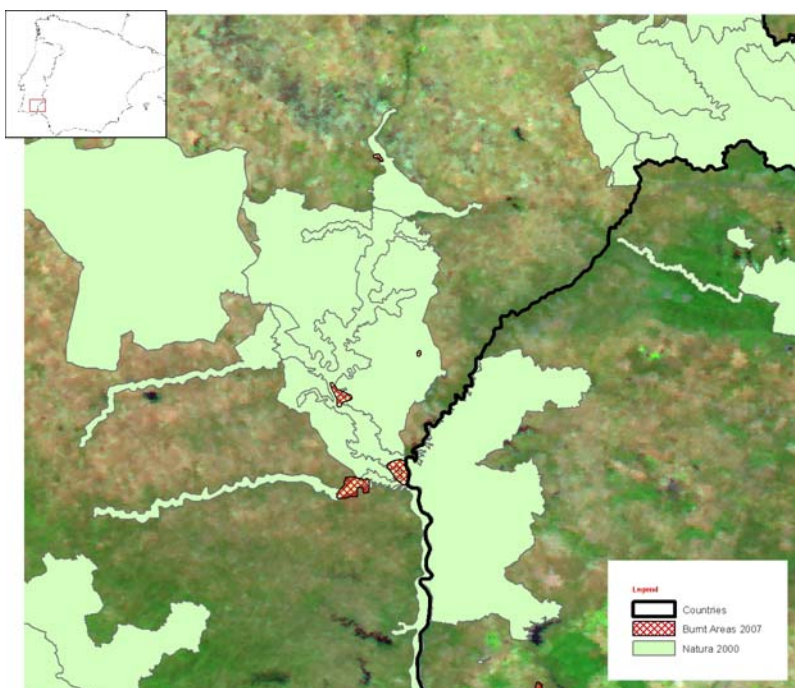


Figure 19. Impact of forest fires in Natura 2000 sites – southern Portugal

The intersection of the burnt areas and the Natura2000 provides additional information on the plant and animal species that are potentially affected by forest fires. The lists of species by categories are provided in *Table 28* to *Table 31*.

*Table 28. Mammal species possibly affected by forest fires.*

Barbastella barbastellus	Myotis emarginatus
Canis lupus	Myotis myotis
Galemys pyrenaicus	Rhinolophus euryale
Lutra lutra	Rhinolophus ferrumequinum
Lynx pardinus	Rhinolophus hipposideros
Miniopterus schreibersi	Rhinolophus mehelyi
Myotis blythii	

*Table 29. Invert species possibly affected by forest fires.*

Callimorpha quadripunctaria	Lucanus cervus
Cerambyx cerdo	Margaritifera margaritifera
Coenagrion mercuriale	Oxygastra curtisii
Euphydrias aurinia	Unio crassus
Geomalacus maculosus	

*Table 30. Plant species possibly affected by forest fires.*

Arabis sadina	Marsilea batardae
Centaurea micrantha ssp. herminii	Marsupella profunda
Dianthus marizii	Narcissus asturiensis
Eryngium viviparum	Narcissus calcicola
	Narcissus pseudonarcissus ssp. nobilis
Festuca brigantina	Salix salvifolia ssp. australis
Festuca duriotagana	Santolina semidentata
Festuca elegans	Silene longicilia
Festuca summilusitanica	Veronica micrantha
Jasione crispa ssp. serpentina	Woodwardia radicans
Juncus valvatus	
Linaria coutinhoi	

*Table 31. Bird species possibly affected by forest fires.*

Aegypius monachus	Emberiza hortulana	Phylloscopus bonelli
Alcedo atthis	Falco naumanni	Phylloscopus trochilus
Anthus campestris	Falco peregrinus	Pluvialis apricaria
Anthus pratensis	Falco subbuteo	Prunella collaris
Anthus spinoletta	Ficedula hypoleuca	Pyrrhocorax pyrrhocorax
Anthus trivialis	Galerida theklae	Regulus regulus
Apus apus	Gyps fulvus	Riparia riparia
Apus melba	Hieraaetus fasciatus	Saxicola rubetra
Aquila chrysaetos	Hippolais polyglotta	Scolopax rusticola
Asio flammeus	Hirundo daurica	Streptopelia turtur
Asio otus	Hirundo rustica	Sturnus vulgaris

Bubo bubo	Jynx torquilla	Sylvia borin
Burhinus oedicephalus	Lanius collurio	Sylvia cantillans
Calandrella brachydactyla	Lanius senator	Sylvia communis
Caprimulgus europaeus	Lullula arborea	Sylvia hortensis
Caprimulgus ruficollis	Luscinia megarhynchos	Sylvia undata
Carduelis spinus	Luscinia svecica	Tetrax tetrax
Cercotrichas galactotes	Melanocorypha calandra	Turdus iliacus
Charadrius dubius	Merops apiaster	Turdus philomelos
Ciconia ciconia	Milvus migrans	Turdus pilaris
Ciconia nigra	Milvus milvus	Upupa epops
Circaetus gallicus	Monticola saxatilis	Vanellus vanellus
Circus cyaneus	Muscicapa striata	
Circus pygargus	Neophron percnopterus	
Clamator glandarius	Oenanthe hispanica	
Coracias garrulus	Oenanthe oenanthe	
Coturnix coturnix	Oriolus oriolus	
Cuculus canorus	Otus scops	
Delichon urbica	Pernis apivorus	
Emberiza citrinella	Phoenicurus phoenicurus	

## Assessment of forest fire damages in Spain

Spain is the 6<sup>th</sup> country most severely affected by fires up to now. The total burned area mapped in Spain until 31 August 2007 was 51 004 ha. As it can be observed in Figure 20, the area burned in Spain during 2007 is way below the average of the last decades. However, due to the intensity of the fires and the damages caused by these in the Canary Islands, the overall damages cannot be regarded as negligible.

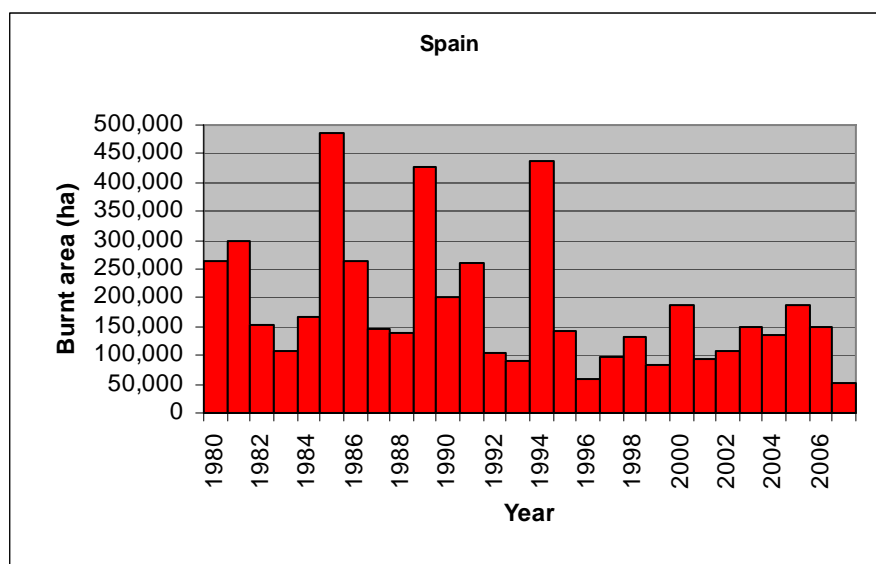


Figure 20. Trend of burnt areas in Spain in the last 27 years.

Table 32 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 map. In terms of land cover, from a total of 51 004 ha of burnt area mapped, 44 150 ha of land have been burnt in forest, 6 821 ha were agricultural land, and 33 ha in artificial areas (urban, industrial and social areas).

Table 32 Distribution of burned area (ha) in Spain by land cover types (until 31 August 2007).

Land cover	Area burned (ha)	% of total burned
Forest land	44 150	86.6
Agriculture	6 821	13.4
Artificial surfaces	33	0.1
<b>Total</b>	<b>51 004</b>	<b>100.0</b>

## Assessment of damages on Natura 2000 sites in Spain

A total of 29,387 ha were burnt in Natura 2000 sites in Spain, which corresponds to 0.2% of the total Natura 2000 area in the country, and 57.6% of the total burnt area. The Natura 2000 sites affected by forest fires in 2007 are listed in Table 33. Figures 21 and 22 show details of the Natura 2000 sites affected in the Canary Islands and southern Spain.

*Table 33. Natura2000 sites directly affected by forest fires in Spain*

	SITECODE	SITENAME	Area (ha)
1	ES0000010	SIERRA DE GUADARRAMA	0.1
2	ES0000041	Ojeda, Inagua y Pajonales	3337.6
3	ES0000095	Tigaiga	90.8
4	ES0000106	Teno	408.2
5	ES0000107	Corona Forestal de Tenerife	5779.1
6	ES0000110	Ayagaures y Pilacones	2239.2
7	ES0000113	Macizo de Tauro	678.2
8	ES0000118	ARRIBES DEL DUERO	241.4
9	ES0000332	LLANOS DE TRUJILLO	551.7
10	ES0000337	ESTRECHO	64.2
11	ES0000415	EMBALSE DE ALCANTARA	31.5
12	ES1130007	Pena Trevinca	173.5
13	ES4120073	RIBERAS DEL R?O OCA Y AFLUENTES	0.3
14	ES4150085	RIBERAS DEL R?O TORMES Y AFLUENTES	3.3
15	ES4150096	ARRIBES DEL DUERO	241.4
16	ES4160109	SIERRA DE GUADARRAMA	70.8
17	ES4190134	LAGUNAS DE TERA Y VIDRIALES	119.7
18	ES5224001	Cova Oscura-Atzeneta del Maestrat	0.9
19	ES6130006	GUADALMELLATO	1461.5
20	ES6130007	GUADIATO-BEMBEZAR	67.1
21	ES6170005	SIERRA CRESTELLINA	24.1
22	ES6170016	VALLE DEL RIO DEL GENAL	23.9
23	ES7010010	Pilacones	1852.9
24	ES7010018	Riscos de Tirajana	1.6
25	ES7010025	Fataga	322.5
26	ES7010039	El Nublo II	4457.2
27	ES7010063	Nublo	589.0
28	ES7011004	Macizo de Tauro II	93.0
29	ES7020043	Parque Nacional del Teide	324.7
30	ES7020052	Chinyero	622.2
31	ES7020054	Corona Forestal	4943.7
32	ES7020074	Los Campeches, Tigaiga y Ruiz	93.6
33	ES7020096	Teno	322.7
34	ES7020100	Cueva del Viento	85.4
35	ES7020115	Laderas de Ch?o	70.1
	Total		29387.4



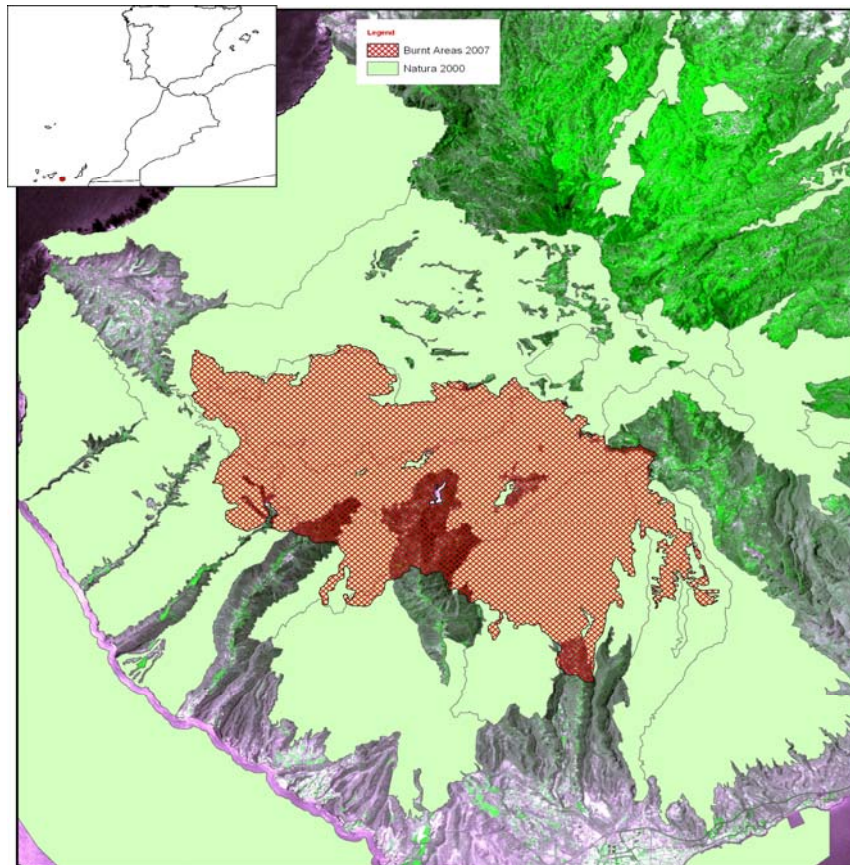


Figure 21. Impact of forest fires in the Natura 2000 sites of the Canary Islands

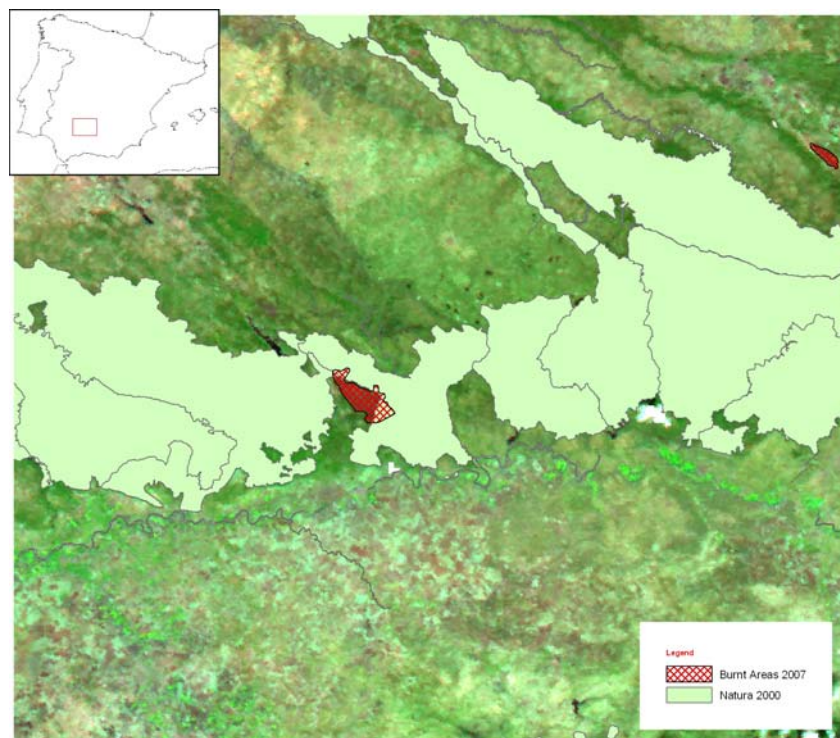


Figure 22. Impact of forest fires in Natura 2000 sites – southern Spain

The intersection of the burnt areas and the Natura2000 provides additional information on the plant and animal species that are potentially affected by forest fires. The lists of species by categories are provided in Table 34 to Table 37.

*Table 34. Mammal species affected by forest fires.*

Barbastella barbastellus	Myotis blythii
Canis lupus	Myotis emarginatus
Galemys pyrenaicus	Myotis myotis
Lutra lutra	Phocoena phocoena
Lynx pardinus	Rhinolophus euryale
Microtus cabrerai	Rhinolophus ferrumequinum
Miniopterus schreibersi	Rhinolophus hipposideros
Mustela lutreola	Tursiops truncatus
Myotis bechsteini	

*Table 35. Invert species affected by forest fires.*

Austropotamobius pallipes	Graellsia isabellae
Euphydryas aurinia	Lucanus cervus
Geomalacus maculosus	Oxygastra curtisii
Gomphus graslinii	

*Table 36. Plant species affected by forest fires.*

Anagyris latifolia	Limonium spectabile
Bencomia brachystachya	Limonium sventenii
Crambe arborea	Lythrum flexuosum
Crambe laevigata	Marsilea strigosa
Dendriopoterium pulidoi	Narcissus asturiensis
Dorycnium spectabile	Narcissus pseudonarcissus nobilis
Eryngium viviparum	Sambucus palmensis
Festuca elegans	Santolina semidentata
Festuca summilusitanica	Silene mariana
Globularia sarcophylla	Stemmacantha cynaroides
Helianthemum bystropogophyllum	Tanacetum ptarmiciflorum
Holcus setiglumis ssp. duriensis	Teline rosmarinifolia
Hypochoeris oligocephala	Teline salsoloides
Isoplexis isabelliana	Veronica micrantha
Limonium arborescens	Woodwardia radicans

*Table 37. Bird species affected by forest fires.*

Accipiter gentilis	Circus aeruginosus	Luscinia svecica
Accipiter nisus	Circus cyaneus	Melanocorypha calandra
Accipiter nisus granti	Circus pygargus	Milvus migrans
Actitis hypoleucos	Clamator glandarius	Milvus milvus
Aegypius monachus	Columba bollii	Monticola saxatilis
Alauda arvensis	Columba junoniae	Monticola solitarius
Alcedo atthis	Columba oenas	Neophron percnopterus
Anthus campestris	Coracias garrulus	Oenanthe hispanica
Anthus spinoletta	Coturnix coturnix	Oenanthe leucura
Apus caffer	Dendrocopos major	Oenanthe oenanthe

Apus melba	canariensis	
Aquila chrysaetos	Dendrocopos major	Pandion haliaetus
Aquila heliaca adalberti	thanneri	Perdix perdix hispaniensis
Aquila pomarina	Dendrocopos minor	Pernis apivorus
Ardea cinerea	Egretta garzetta	Phalacrocorax carbo
Bubo bubo	Elanus caeruleus	Phoenicurus phoenicurus
Bucanetes githagineus	Emberiza hortulana	Plegadis falcinellus
Burhinus oedicephalus	Falco biarmicus	Pluvialis apricaria
Buteo buteo	Falco columbarius	Pluvialis squatarola
Buteo rufinus	Falco eleonorae	Prunella collaris
Calandrella brachydactyla	Falco naumanni	Pyrrhocorax pyrrhocorax
Calidris alba	Falco peregrinus	Recurvirostra avosetta
Caprimulgus europaeus	Falco subbuteo	Saxicola rubetra
Caprimulgus ruficollis	Falco tinnunculus	Sylvia cantillans
Charadrius alexandrinus	Fringilla teydea	Sylvia conspicillata
Charadrius dubius	Galerida theklae	Sylvia undata
Charadrius hiaticula	Gyps fulvus	Tachybaptus ruficollis
Charadrius morinellus	Hieraaetus fasciatus	Turdus torquatus
Chersophilus duponti	Hieraaetus pennatus	
Ciconia ciconia	Hirundo daurica	
Ciconia nigra	Lanius collurio	
Circaetus gallicus	Larus audouinii	
	Larus ridibundus	
	Lullula arborea	

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**Abstract**

This report presents the assessment of the damages caused by the forest fires in the EU Mediterranean countries (Cyprus, France, Greece, Italy, Portugal and Spain) during the fire season of 2007, with special emphasis on the impact of these fires in Natura 2000 sites. It presents an overall short summary for the whole region and a detail analysis for each of the EU Mediterranean countries. For each country the report describes the tendency in the areas burnt by fires in the country during the last 27 years using the EU Fire database of the European Forest Fire Information System (EFFIS); in the case of Cyprus the report is limited to the last 8 years. Maps of burnt areas obtained through the processing of satellite imagery in EFFIS are presented next to the list of Natura 2000 sites affected by the fires. Lastly, the report includes the list of plant and animal species of special interest in the Natura 2000 that were likely affected by the forest fires.

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